

What is claimed is:

1. A spine stabilization system, comprising:

an implant having a first end and an opposite second end, at least a portion of one of said first and second ends positioned in a tunnel formed in a first vertebral body; and
at least one anchor engaged to the first vertebral body attaching said one end of said implant to the first vertebral body.

2. The system of claim 1, wherein said at least one anchor is embedded in the tunnel.

3. The system of claim 1, wherein the other of said first and second ends of said implant is embedded in a second tunnel formed in a second vertebral body and further comprising a second anchor engaged to the second vertebral body attaching said implant to the second vertebral body.

4. The system of claim 3, further comprising a device positioned in a spinal disc space between the first vertebral body and the second vertebral body.

5. The system of claim 1, wherein the tunnel forms an angle relative to the axial plane of the spinal column in the range of 0 degrees to 80 degrees.

6. The system of claim 5, wherein said angle is in the range of about 25 degrees to about 65 degrees.

7. The system of claim 1, wherein said at least one anchor is selected from the group consisting of: an interference screw, a suture anchor, a button, a spiked washer, and a pin fastener.

8. The system of claim 3, wherein said implant is an artificial ligament.

9. The system of claim 8, wherein said artificial ligament extends along the anterior faces of the first vertebral body and the second vertebral body.

10. The system of claim 8, wherein said artificial ligament extends along the lateral faces of the first vertebral body and the second vertebral body.

11. The system of claim 8, wherein said artificial ligament extends between a pedicle of the first vertebral body and a pedicle of the second vertebral body.

12. The system of claim 8, wherein said artificial ligament comprises a synthetic resorbable material selected from the group consisting of: polylactide, polyglycolide, tyrosine-derived polycarbonate, polyanhydride, polyorthoester, polyphosphazene, calcium phosphate, hydroxyapatite, bioactive glass and combinations thereof.

13. The system of claim 8, wherein said artificial ligament comprises a natural resorbable material selected from the group consisting of: autograft, allograft, xenograft, soft tissues, connective tissues, demineralized bone matrix, and combinations thereof.

14. The system of claim 8, wherein said artificial ligament comprises a nonresorbable material selected from the group consisting of: polyethylene, polyester, polyvinyl alcohol, polyacrylonitrile, polyamide, polytetrafluoroethylene, poly-paraphenylene terephthalamide, cellulose, shape-memory alloys, titanium, titanium alloys, stainless steel, and combinations thereof.

15. The system of claim 1, wherein said at least one anchor is positioned in a second tunnel that intersects the tunnel in which said one end of said implant is positioned.

16. The system of claim 15, wherein the tunnel extends from an anterior face of the first vertebral body and the second tunnel extends from a lateral face of the first vertebral body.

17. The system of claim 15, wherein the tunnel extends from an anterior face of the first vertebral body and the second tunnel extends from an antero-lateral face of the first vertebral body.

18. The system of claim 17, wherein the tunnel is curved toward the second tunnel and the second tunnel extends obliquely relative to the saggital plane.

19. The system of claim 15, wherein:

the tunnel extends from an anterior face of the first vertebral body adjacent one vertebral endplate at a first angle relative to the axial plane of the spinal column; and the second tunnel extends from the anterior face of the first vertebral body adjacent the other endplate at a second angle relative to the axial plane of the spinal column.

20. The system of claim 19, wherein said first angle and said second angle are equal.

21. The system of claim 1, wherein:

the tunnel extends through the first vertebral body from a first opening adjacent one endplate of the first vertebral body to a second opening adjacent the other endplate of the first vertebral body; and

said one end of said implant extends from the first opening through the tunnel and is attached to the first vertebral body at the second opening with said at least one anchor.

22. The system of claim 21, wherein said at least one anchor is a button positioned against the first vertebral body at the second opening.

23. The system of claim 21, wherein said first opening opens at the one vertebral endplate.

24. The system of claim 1, further comprising:

a second implant having a first end and an opposite second end, at least a portion of said first and second ends of the second implant positioned in a second tunnel formed in the first vertebral body; and

a second anchor engaged to the first vertebral body attaching said second implant to the first vertebral body.

25. The system of claim 24, wherein:

said implant is attached along the anterior face of the first vertebral body on one side of the sagittal plane; and

said second implant is attached along the anterior face of the first vertebral body on the other side of the sagittal plane.

26. The system of claim 24, wherein:

at least a portion of the other of said first and second ends of said implant is positioned in a third tunnel formed in a second vertebral body and further comprising a third anchor attaching said implant to the second vertebra; and

at least a portion of the other of said first and second ends of said second implant is positioned in a fourth tunnel formed in the second vertebral body and further comprising a fourth anchor attaching said second implant to the second vertebra.

27. The system of claim 26, wherein said implant and said second implant are parallel to one another.

28. The system of claim 26, wherein said implant and said second implant cross over one another.

29. The system of claim 26, wherein each of said at least one anchor, said second anchor, said third anchor and said fourth anchor are interference screws positioned in respective ones of the tunnel, the second tunnel, the third tunnel, and the fourth tunnel in engagement with the respective ends of said implant and said second implant.

30. The system of claim 1, further comprising:
a second tunnel formed in the first vertebral body and spaced from the tunnel;
a third tunnel extending through a second vertebral body from a first opening adjacent one endplate of the second vertebral body to a second opening adjacent the one endplate of the second vertebral body, wherein said implant extends through the third tunnel and at least a portion of the other of said first and second ends is positioned in the second tunnel, and further comprising a second anchor engaged to the first vertebral body attaching said other end of said implant to the first vertebral body.

31. The system of claim 1, wherein the tunnel extends between a first opening adjacent an endplate of the first vertebral body and a second opening adjacent the endplate of the first vertebral body, and further comprising a second tunnel extending through a second vertebral body from a third opening adjacent one endplate of the second vertebral body to a fourth opening adjacent the one endplate of the second vertebral body, wherein said implant

extends through the second tunnel and the other of said first and second ends extends into the first tunnel and overlaps said one end of said implant attached to the first vertebral body.

32. The system of claim 1, further comprising a notch formed in the first vertebral body, the tunnel extending from an opening formed in the notch, wherein said at least one anchor is positioned in the notch.

33. The system of claim 1, wherein said at least one anchor extends along said one end of said implant.

34. The system of claim 1, wherein said at least one anchor intersects said one end of said implant.

35. The system of claim 1, wherein said at least one anchor is attached to said one end of said implant.

36. The system of claim 1, further comprising a second tunnel formed in the first vertebral body spaced from the tunnel, and wherein said one end of said implant has a second portion positionable in the second tunnel and attached thereto with a second anchor engaged to the first vertebral body.

37. The system of claim 1, wherein said implant comprises a substantially inelastic material.

38. The system of claim 1, wherein said implant comprises a substantially flexible material.

39. A method for stabilizing a portion of the spinal column, comprising:
providing an implant having a first end and an opposite second end;
forming a tunnel in a first vertebral body;
placing at least a portion of one the first end and the second end of the implant in the tunnel; and

attaching the one end of the implant to the first vertebral body.

40. The method of claim 39, wherein forming the tunnel includes forming the tunnel at an angle relative to the axial plane of the spinal column in the range of 0 degrees to 80 degrees.

41. The method of claim 39, wherein attaching the one end includes placing at least one anchor in the tunnel in the first vertebral body.

42. The method of claim 41, further comprising:
forming a second tunnel in a second vertebral body;
placing the other of the first end and the second end of the implant in the second tunnel; and

attaching the other end of the implant in the second tunnel of the second vertebral body.

43. The method of claim 42, wherein attaching the other end includes placing at least one anchor in the second tunnel in the second vertebral body.

44. The method of claim 42, wherein the first tunnel and the second tunnel are formed such that the implant extends along the anterior faces of the first vertebral body and the second vertebral body.

45. The method of claim 42, wherein the first tunnel and the second tunnel are formed such that the implant extends along the lateral faces of the first vertebral body and the second vertebral body.

46. The method of claim 42, wherein the first tunnel and the second tunnel are formed such that the implant extends along the posterior of the first vertebral body and the second vertebral body.

47. The method of claim 42, further comprising inserting a device in a spinal disc space between the first vertebral body and the second vertebral body.

48. The method of claim 39, further comprising:
forming a second tunnel in the first vertebral body that intersects the tunnel; and

inserting at least one anchor in the second tunnel to attach the implant.

49. The method of claim 48, wherein forming the tunnel includes forming the tunnel in communication with the anterior face of the first vertebral body, and forming the second tunnel includes forming the second tunnel in communication with the lateral face of the first vertebral body.

50. The method of claim 48, wherein forming the tunnel includes forming the tunnel in communication with the anterior face of the first vertebral body, and forming the second tunnel includes forming the second tunnel in communication with the antero-lateral face of the first vertebral body.

51. The method of claim 48, wherein:

forming the tunnel includes forming the tunnel in communication with the anterior face of the first vertebral body adjacent one of its endplates and at a first angle relative to the axial plane of the spinal column; and

forming the second tunnel includes forming the second tunnel in communication with the anterior face of the first vertebral body adjacent the other of its endplates at a second angle relative to the axial plane.

52. The method of claim 39, wherein:

forming the tunnel includes forming the tunnel from a first opening adjacent one endplate of the first vertebral body to a second opening adjacent the other endplate of the first vertebral body;

placing the implant includes placing the one end of the implant through the first opening and the tunnel to the second opening; and

attaching the one end includes attaching the one end of the implant at the second opening.

53. The method of claim 52, wherein the first opening extends through the one endplate.

54. The method of claim 39, further comprising:

providing a second implant having a first end and an opposite second end;
forming a second tunnel in the first vertebral body;
placing at least portion of one of the first end and second end of the second implant into the second tunnel; and
attaching the one end of the second implant to the first vertebral body.

55. The method of claim 54, further comprising:

forming a third tunnel in a second vertebral body;
placing the other of the first and second ends of the implant in the third tunnel;
attaching the other end of the implant to the second vertebral body;
forming a fourth tunnel in the second vertebral body;

placing the other of the first end and second end of the second implant in the fourth tunnel; and

attaching the other end of the second implant to the second vertebral body.

56. The method of claim 55, wherein the first and second implants are attached to the first and second vertebral bodies in a parallel arrangement.

57. The method of claim 55, wherein the first and second implants are attached to the first and second vertebral bodies in an X -shaped arrangement.

58. The method of claim 39, further comprising:

forming a second tunnel formed in the first vertebral body spaced from the tunnel;

forming a third tunnel in a second vertebral body from a first opening adjacent one endplate of the second vertebral body to a second opening adjacent the one endplate of the second vertebral body;

placing the implant through the third tunnel;

placing the other of the first end and second end of the implant into the second tunnel;

and

attaching the other end in the second tunnel to the first vertebral body.

59. The method of claim 39, wherein:

forming the tunnel includes forming the tunnel between a first opening adjacent one endplate of the first vertebral body and a second opening adjacent the one endplate of the first vertebral body, and further comprising:

forming a second tunnel through a second vertebral body from a third opening adjacent one endplate of the second vertebral body to a fourth opening adjacent the one endplate of the second vertebral body;

placing the implant through the second tunnel;

placing the one end of the implant into the tunnel through the first opening;

placing the other of said first and second ends of the implant into the tunnel through the second opening and adjacent the one end of the implant in the first tunnel; and attaching the first and second ends to the first vertebral body.

60. The method of claim 39, further comprising:

forming a notch in the first vertebral body;

forming the tunnel includes forming the tunnel in communication with the notch; and attaching the one end to the first vertebral body in the notch.

61. A spine stabilization system, comprising:

an implant having a first end with at least a portion of said first end positionable in a first tunnel formed in a first vertebral body, said implant having a second end positionable in a second tunnel formed in a second vertebral body; and

a first anchor engageable to said first end of said implant in the first tunnel of the first vertebral body; and

a second anchor engageable to said second end of said implant in the second tunnel of the second vertebral body.

62. The system of claim 61, wherein said implant, said first anchor, and said second anchor are each made from resorbable material.

63. The system of claim 61, wherein said implant, said first anchor and said second anchor are each made from nonresorbable material.

64. The system of claim 61, wherein the first tunnel in the first vertebral body and the second tunnel in the second vertebral body each form an angle relative to the axial plane.

65. The system of claim 61, wherein said implant extends along the anterior faces of the first vertebral body and the second vertebral body.

66. The system of claim 61, wherein said implant extends along the lateral faces of the first vertebral body and the second vertebral body.

67. The system of claim 61, wherein said artificial ligament extends between a pedicle of the first vertebral body and a pedicle of the second vertebral body.

68. The system of claim 61, wherein said first anchor is positioned in a third tunnel in the first vertebral body that intersects the first tunnel and said second anchor is positioned in a fourth tunnel in the second vertebral body that intersects the second tunnel.

69. The system of claim 68, wherein the first and second tunnels each extend from an anterior face of the first vertebral body and second vertebral body, respectively, and the third and fourth tunnels each extend from a lateral face of the first vertebral body and the second vertebral body, respectively.

70. The system of claim 68, wherein:

the first tunnel extends from an anterior face of the first vertebral body adjacent one endplate at a first angle relative to the axial plane of the spinal column; and

the third tunnel extends from the anterior face of the first vertebral body adjacent the other endplate at a second angle relative to the axial plane of the spinal column;

the second tunnel extends from an anterior face of the second vertebral body adjacent one endplate at a third angle relative to the axial plane of the spinal column; and

the fourth tunnel extends from the anterior face of the first vertebral body adjacent the other endplate at a fourth angle relative to the axial plane of the spinal column.

71. The system of claim 61, wherein:

the first tunnel extends through the first vertebral body from a first opening adjacent one endplate of the first vertebral body to a second opening adjacent the other endplate of the first vertebral body; and

said first end of said implant extends from the first opening through the first tunnel and is attached to the first vertebral body at the second opening with said first anchor;

 the second tunnel extends through the second vertebral body from a third opening adjacent one endplate of the second vertebral body to a fourth opening adjacent the other endplate of the second vertebral body; and

 said second end of said implant extends from the third opening through the second tunnel and is attached to the second vertebral body at the fourth opening with said second anchor.

72. The system of claim 61, wherein said first anchor extends along said first end of said implant and said second anchor extends along said second end of said implant.

73. The system of claim 61, wherein said first anchor intersects said first end of said implant and said second anchor intersects said second end of said implant.

74. The system of claim 61, wherein said first anchor is attached to said first end of said implant and said second anchor is attached to said second end of said implant.

75. The system of claim 61, wherein said implant includes a first segment attached to the first vertebral body and a second segment attached to the second vertebral body, said first segment and said second segment being coupled to one another.

76. The system of claim 61, wherein said implant comprises a substantially inelastic material.

77. The system of claim 61, wherein said implant comprises a substantially flexible material.